

3rd Grade
Water Quantity

Name That Surface Water

LEARNING OBJECTIVES

The student will be able to explain how reservoirs and lakes form and why they are important. The student will begin to understand the importance of wetlands as natural filters.

STUDENT PERFORMANCE OBJECTIVES

- * The student will be able to identify types of surface water.
- * The student will be able to give reasons for building a reservoir.
- * The student will use the Ecoplex Web site to discover elevation levels for Denton area lakes.
- * The student will map Denton area surface water.
- * The student will identify reasons for conserving water.
- * The student will recognize and reflect on their personal use of water.

BACKGROUND

Surface water is water that is not absorbed into the earth or returned to the atmosphere by evaporation or transpiration, instead it is stored in lakes, reservoirs, wetlands, streams, rivers, creeks, marshes, bogs, oceans etc. Water that flows across surfaces rather than being absorbed by the earth is called runoff. Runoff adds to surface water amounts and occasionally causes floods. As buildings and concrete are constructed appear in what was once a field or creek, runoff patterns are altered. A lake is water that has collected in a low area. The water is not trapped but enters faster than it can escape. A reservoir is a man-made lake. Reservoirs are created by using a dam to trap water. There are 78 reservoirs in Texas. The 79th is Caddo Lake. Some consider Caddo Lake the only natural lake in Texas while others disagree.

A reservoir is built for a variety of reasons: an additional drinking water supply, flood control, maintain water levels in canals that are travel ways, water for hydroelectric plants, irrigation, and recreation.

Land that remains wet at least part of the year is considered a wetland. A wetland is the land between dry land and a body of water. Wetlands are one of the Earth's natural ways to clean water. Because water slowly seeps through the wetland, chemicals or organic wastes can be filtered naturally. Occasionally, wetlands are

used to treat agricultural, industrial or mining wastewater. This method usually costs less, is more pleasing aesthetically, and attracts wildlife.

Conservation is the act of keeping, protecting, or preserving our natural resources. Examples of conserving water are: using low flow shower heads, turning off water while brushing teeth or soaping hands, adding an object to the toilet tank to displace water, and collecting water, which usually goes down the drain, while you wait for the water to warm. Planting vegetation that is drought tolerant (naturescaping) and watering in the morning are also helpful ways to conserve water.

We need to conserve water for a variety of reasons. There is a finite amount of water on Earth. Only 3% of the Earth's water is fresh, of this 1% can be used to meet our freshwater needs. While the amount of usable water is virtually unchanged, our population continues to increase. Water conservation saves money on the chemicals used to treat water and energy to pump it and heat it in your home. Drought (very little rain falls and there is a long period of dry weather) is another reason for conserving water.

See other lessons on [water cycle](#), [watershed](#), and [water treatment](#).
<for more>

MATERIALS

* Salt dough relief map **TEACHER PREPARATION** – *Several days prior* to the opening activity create a salt dough map. Make 3 batches for the relief map. (For the best results, do not double the recipe. This map can be used for the 3rd water quality lesson.)

Foil lasagna pan

Food coloring

1 and ¾ cups of flour

½ cup salt

1 cup water

1 tablespoon cooking oil

2 teaspoons cream of tartar

Paintbrush

Waterproof paint

Mix ingredients until a ball forms. Food coloring may be added. Place dough into a foil lasagna pan. Press dough out to the edges of the pan. On one end create 2 depressions that will join in the middle of the pan in the shape of a “V”. On the opposite end of the pan create another depression that will join the “V” creating a “Y”. These depressions will serve as rivers. Create a depression

where all the rivers join. This will create a lake. Use a paintbrush to “paint” the model with food coloring (land green, rivers blue). Allow the model to dry for 3 days. Paint the dough with waterproof paint so that it can be used again.

- * Pitcher of water

- * 3 to 5 3x9 indoor/outdoor carpet samples

- * 3 to 5 clear 9x13 dishes

- * 3 to 5 packages of clay

- * 3 to 5 Stop watches

- * Post It Notes?

- * www.ecoplex.unt.edu

- * Stop watch

- * Class set of Personal Water Surveys [WQty/3-1]

- * Class set of Ecoplex maps **TEACHER PREPARATION-** The day before teaching this lesson, download the surface water map from the Ecoplex site. White out the names of the surface water. Make a class set of the altered maps. Students will label the maps using the map on the Ecoplex.

OPENING

Demonstrate one of the ways a lake can be formed by pouring water (add food coloring to really make the water obvious) down the salt dough relief map rivers. The rivers should all merge into a low-lying area thus forming a lake. Allow the students to observe and describe how rivers can form lakes.

PROCEDURE

1. Define lake, reservoir, and surface water.
2. Ask students to guess how many reservoirs and lakes there are in Texas. After a few guesses, share the correct number with the class and discuss why Texas may have so many reservoirs (TX doesn't have much rain, TX is a large state etc.).
3. Brainstorm uses for a lake or reservoir. Record the ideas on Post It Notes? . Ask the students to think of category headings for the uses of reservoirs (survival, recreation, agriculture, etc.). Record the heading titles in a row on the chalkboard. Ask the students to sort the Post It Notes? below the appropriate category.
4. Ask students to name lakes they have visited. Ask them which lakes/reservoirs they think our drinking water comes from.

5. Explain that Lake Lewisville is the main source for Denton, but water can be removed from Lake Ray Roberts.
6. Distribute the student set of Ecoplex maps. Using the Ecoplex Web site map, label as many surface water bodies as possible including: Elm Fork, Pecan Creek of the Trinity, Lake Lewisville and Lake Ray Roberts.
7. Explain that not only is it important to know where our water comes from, but also to educate ourselves about how much water we have. We can begin by paying attention to rainfall. Rainfall or lack of rain is important to communities because that data warns of floods or droughts.
8. Direct students to click on the lake rainfall button at the bottom of the Ecoplex main menu, students will scroll to Lake Lewisville. In the year field, ask groups of students to enter different years within the last 10 years. Print data.
9. Compare the rainfall data results. Students should notice the drop in rainfall during 1999.
10. Explain that next we will observe lake elevation (depth) data. Elevation is an important part of the decision to empty water from Lake Ray Roberts into Lake Lewisville. Evaporation, runoff, and rainfall also play a part in the decision.
11. Direct students to the main menu of Ecoplex. Click on lake data. On the Ft. Worth District Reservoir Control Office data page, scroll to Lewisville. Enter a start date of 1-01-98 and span through your current date. Click on "Lake elevation" and "Tabular text" format, everything else should be blank or click "No". Print data.
12. Ask students to share their elevation data from various years. What does elevation tell them about their water source? Do they notice any correlation to the rainfall data?
13. Go back to the Hydrologic Data page and click on the "maximum and minimum elevation" line (just below the paragraph about the site).
14. Ask the students, "If you knew the lake was getting low, would you do something at home to conserve water? If yes, would you be willing to do something all the time to conserve water? Remind students that we never know when a drought may

occur.

15. Brainstorm all the ways the students use water. Distribute worksheet [WQty/3-1]. Record the water use ideas in the first column. Next to each idea write a water conservation suggestion.
16. Ask the students to keep track of their water use for 48 hours. The student will place a zero (0) or a plus (+) will be placed in the Data Column. The 0 indicates that the student uses water as listed, and + indicates that the student practiced the conservation idea.
17. Explain to students that there is another type of surface water called a wetland.
18. Define wetland and instruct students to create a wetland simulation per instructions below.
19. Divide students into small groups.
20. Give each group a clear rectangular dish or clear, plastic sweater box, package of modeling clay, 3x2 inch section of indoor/outdoor carpeting, and access to water.
21. Students will smooth the clay from the bottom center of the dish slanting upwards to the top edge of the dish.
22. Ask the students to pour 2 cups of water down the clay into the dish and time how long it takes the water to reach the other side. Empty the dish of water.
23. Place the indoor/outdoor carpet strip, which represents the wetland, against the clay. Pour another 2 cups of water down the clay and time how long it takes for the water to reach the other side of the dish. Students will observe that the water will move slowly through the “wetland”.
24. Explain that not only does a wetland filter or clean the water, it also provides a natural flood control.

**SO WHAT?
(LIFE APPLICATION)**

Ask the students to think about what life would be like if our water supply were rationed (limited). This might mean that watering yards, washing cars etc. were activities that could only be done on certain days. Some states allow only a certain number of gallons of water to be used each day per family. If a family exceeds their

CURRICULUM EXTENSIONS

allotment, they must pay a higher price for the water. Discuss what each child could do to help conserve water. Suggest that the class educate others on ways to conserve so that we are all working together. Ask each student to create a page for a class book that illustrates a conservation idea. Display the book in the office or library.

Science

In small groups, students create their own salt dough relief maps that reflect their watershed.

Art

Create a mural of the different types of surface water. Include how we use surface water in the mural. Ex: someone fishing, a dam.

Math

Using the Ecoplex precipitation data from various years, ask students to find averages for different months.

TEKS: Science: 3.1A,B, 3.2B,C,D, 3.3A,C, 3.4A, 3.7A, 3.11A

RESOURCES

<http://www.ecoplex.unt.edu>

<http://www.ga.usgs.gov/edu/mearthsw.html>

<http://www.rgs.edu.sg/virtual/bio/flylab/Wetlands.html>